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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/824,754	04/04/2001	Chih-Chung Lu	LUCH3001/EM/6658	9716
7590 09/24/2004			EXAMINER	
BACON & THOMAS, PLLC			NORRIS, TREMAYNE M	
4th Floor			ART UNIT	
625 Slaters Lane			PAPER NUMBER	
Alexandria, VA 22314-1176			2137	

DATE MAILED: 09/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/824,754

**Applicant(s)**

LU ET AL.

**Examiner**

Tremayne M. Norris

**Art Unit**

2137

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1- rejected under 35 U.S.C. 102(b) as being anticipated by Gressel et al (5,742,530).

Regarding claim 1, Gressel teaches a high-performance Booth-encoded Montgomery module for performing the computation of  $A * B * r^{-1} \pmod{N}$ , where A, B and N are the (n-bit) multiplier, (n-bit) multiplicand, and (n-bit) modular number, respectively, and  $r = 2^n$ , the module comprising (col.2 lines 26-30; col.3 line 15 thru col.10 line 67):

a Booth encoder for receiving two bits of a to perform a Booth encoding process, so as to produce a Booth code for output (col.17 lines 24-33),

a multiplicand selector for receiving B and the Booth code output from the Booth encoder so as to select a multiplicand based on the Booth code for output (col.15 lines 38-43);

Art Unit: 2137

a first carry propagate adder for adding the output of the multiplicand selector and a previous computation result to output (col.17 lines 35-40; col.19 lines 33-39; col.20 lines 21-58 "Ad1");

a multiplexer for receiving four inputs 0, N, 2N, and 3N from a lookup table and selecting one of the inputs to output (col.19 lines 56-60);

a second carry propagate adder for adding the outputs of the first carry propagate adder and the multiplexer to output (col.17 lines 35-40; col.19 lines 33-39; col.20 lines 21-58 "Ad2"); and

a shifter for shifting the output from the second carry propagate adder to right by two bits, so as to produce a computation result (col.21 lines 35-38).

Regarding claim 2, Gressel teaches a register for buffering the computation result (col.21 lines 35-42).

Regarding claim 3, Gressel teaches the multiplicand selected by the multiplicand selector is 2B, B, 0, -B, or -2B (col.15 lines 38-43).

Art Unit: 2137

Regarding claim 5, Gressel teaches the input  $2N$  is produced by shifting the input  $N$  to left with a shifter so that only three inputs  $0$ ,  $N$  and  $3N$  are required in the lookup table. (col.13 lines 21-32).

Regarding claim 6, Gressel teaches a modular selector for selecting  $0$ ,  $N$ ,  $2N$ , or  $3N$  to be added to the second carry propagate adder (col.20 lines 49-58).

Regarding claim 7, Gressel teaches each carry propagate adder has a row of full adders, and every four full adders are grouped together, such that two corresponding full adder groups of the first and second carry propagate adders form a Montgomery cell for being used as a pipelining stage (col.19 lines 20-25).

Regarding claim 8, Gressel teaches a plurality of Montgomery cells for constructing a Montgomery modular multiplier (col.17 lines 19-23; col.19 lines 16-19).

Regarding claim 9, Gressel teaches a multiplexer and a data loop to reuse the Montgomery cells, so that the cell number can be reduced by  $\frac{1}{2}$  (col.2 lines 13-19; col.22 lines 6-67).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gressel, and further in view of Chehrazi et al (US pat 6,301,599).

Regarding claim 4, Gressel teaches the module of claim 3, but does not teach the Booth code is 3-bit. Chehrazi teaches the Booth code is 3 bit (col.3 line 45 thru col.4 line 10). It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined Gressel's modular multiplication device with Chehrazi's multiplier circuit in order to perform multiplications much more quickly, which will enable computers and electronics systems to process multimedia data with greater efficiency (Chehrazi col.2 lines 10-61).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tremayne M. Norris whose telephone number is (571)

Art Unit: 2137

272-3874. The examiner can normally be reached on M-F 7:30AM-5:00PM alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on (571) 272-3868. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tremayne Norris

September 16, 2004



Andrew Caldwell  
Andrew Caldwell